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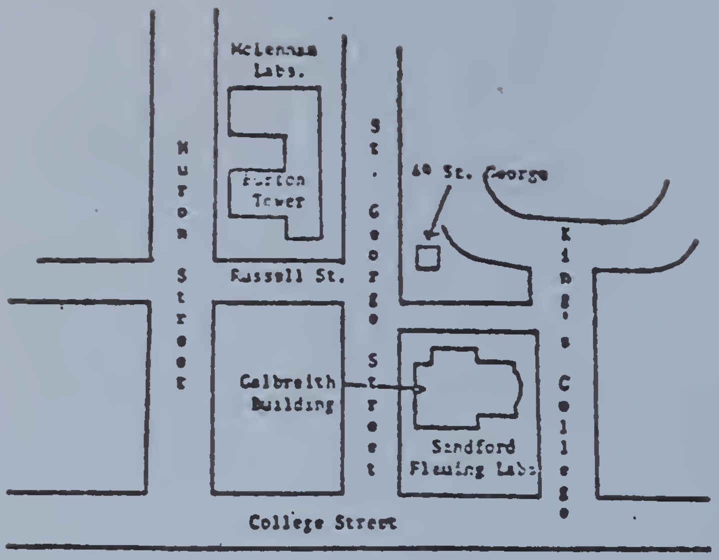
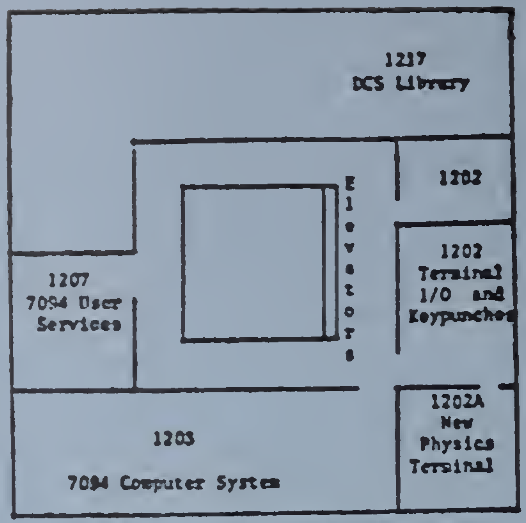
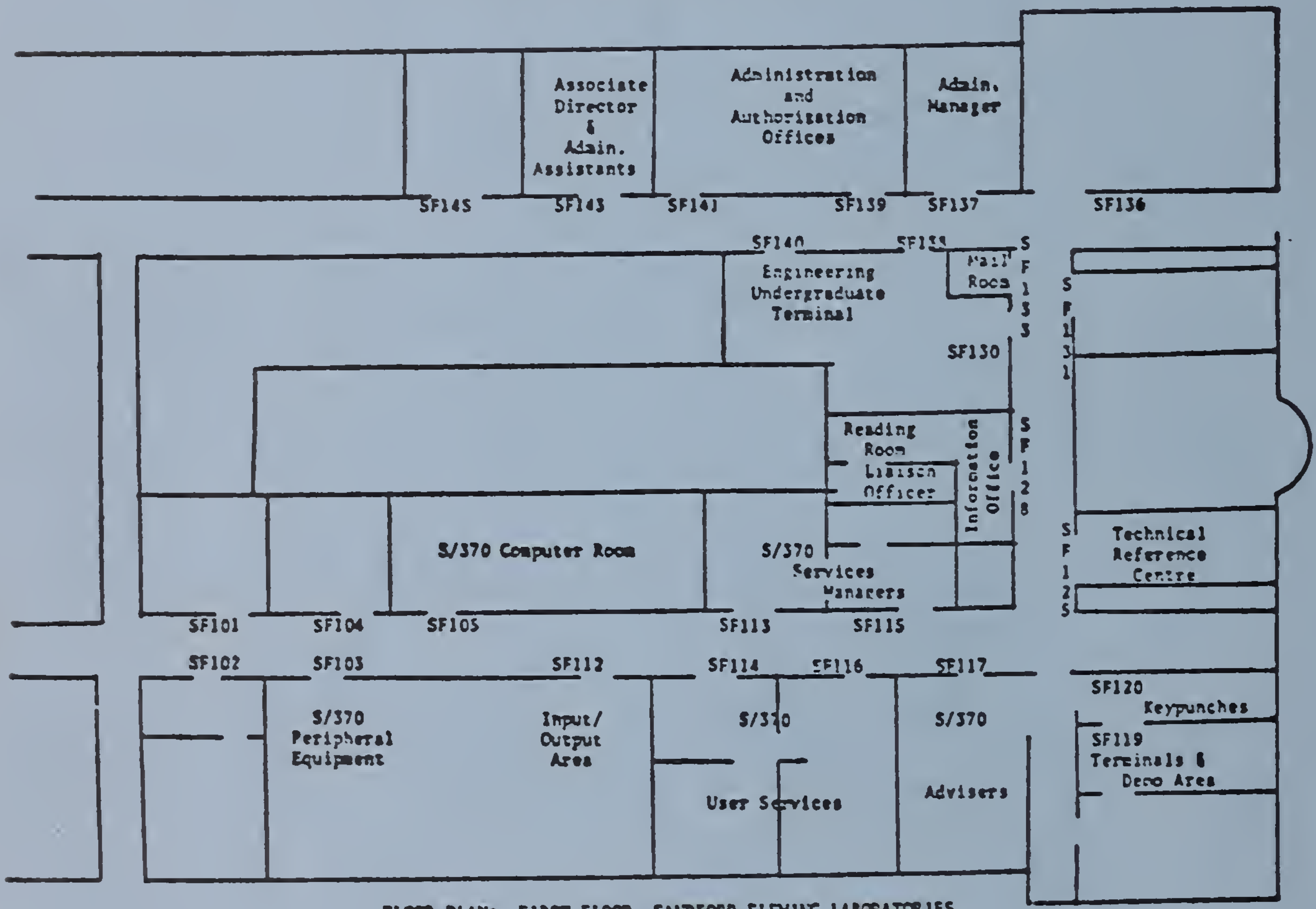


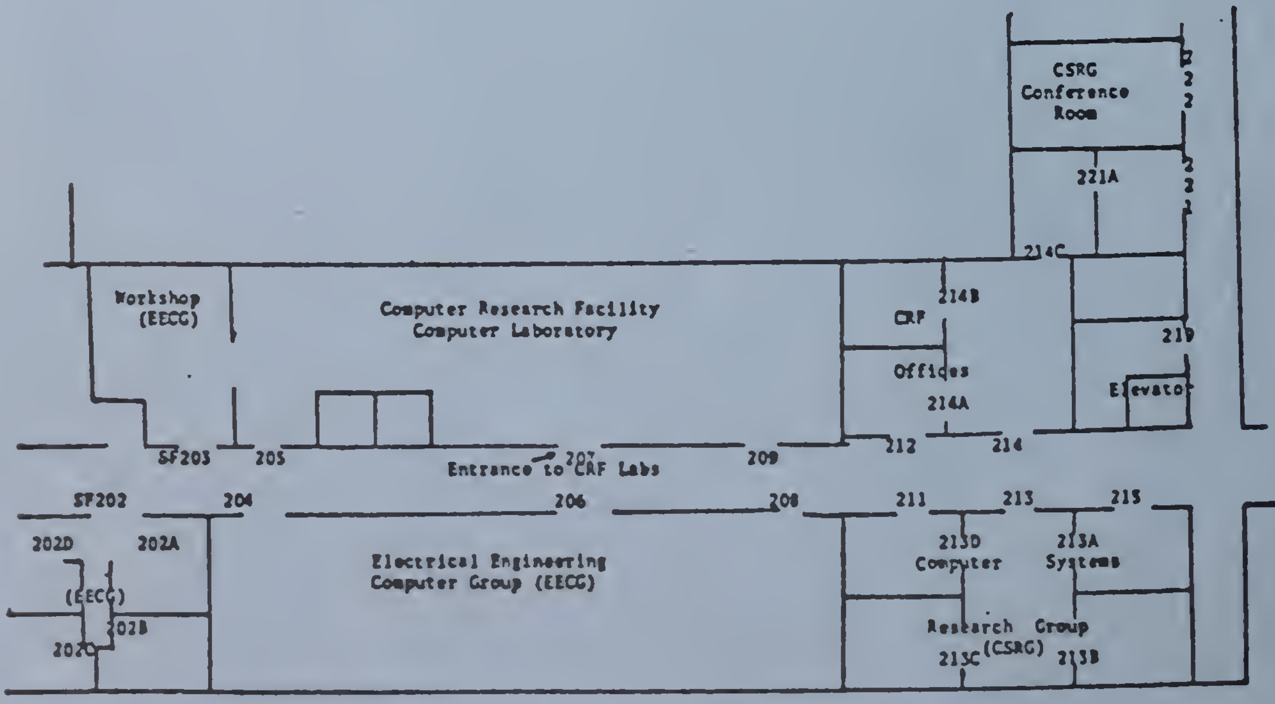


FLOOR PLAN: TWELFTH FLOOR, BURTON TOWER

UNIVERSITY OF TORONTO COMPUTER CENTRE



FLOOR PLAN: FIRST FLOOR, SANDFORD FLEMING LABORATORIES



FLOOR PLAN: SECOND FLOOR, SANDFORD FLEMING LABORATORIES

NEW ADMINISTRATION MANAGER

I am pleased to announce the appointment of Mr. Tony Pieterse as Administration Manager for the University of Toronto Computer Centre.

Previous to his appointment to UTCC, Mr. Pieterse worked for several years with the Controller's Office here at the university as Manager of Operating Expenditure Accounting. I am sure that his experience with the finances of the university will provide a solid foundation for his work at the Computer Centre.

John Wilson

UTCC ASSISTANT EDITOR

This month, we welcome a new member of the UTCC Publications group. Margo Harvie joins us as Assistant to the Publications Editor. Margo has gained a diversity of experience in the publication and promotional fields, having spent the past three years in the publication and newspaper industries. Margo can be contacted in the Sandford Fleming Building room 125, phone 928-4864.

Janet Campbell

UTCC OPEN HOUSE

During the second and third weeks of September, the University of Toronto Computer Centre will be holding its second Open House. The primary purpose of Open House is to introduce users to the computing facilities available at UTCC. Scheduled events include introductory lectures, instructional tours and demonstrations of the displays, equipment and special computing aids available at UTCC. Although most of the events will be of particular interest to the novice or new UTCC users, there are several presentations which may be of interest to the experienced user. These include the tour of the Computer Research Facility and the introduction to the new DATATALK service.

One of the major innovations of this year's Open House is the screening of the UTCC-produced video tape which depicts a typical UTCC High Speed Terminal, the procedures required to operate the self-service equipment and what to do when error checks are produced on the machines. UTCC has also made arrangements to present introductory lectures on the High Speed facilities in the first year Engineering and Computer Sciences courses. It is hoped that the film and special lectures will be helpful in familiarizing new UTCC users with the facilities they will be using during the school year.

A schedule of Open House events follows. For additional information, watch for signs posted in the terminal areas or contact the Information Office at 928-4990.

cont'd...

UTCC OPEN HOUSE Cont'd...

OPEN HOUSE SCHEDULE

Introduction to Batch Computing

This presentation is designed to introduce the new user to the batch facilities available at the University of Toronto. (Note: First year Engineering and Computer Science students will receive this information in class.)

Place	Date & Time
Galbraith Bldg. Room 202	Sept. 12 2 p.m. Sept. 13 2 p.m. Sept. 16 10 a.m.
Erindale	Sept. 18 2 p.m.
Scarborough Room S143	Sept. 18 2 p.m.

DATATALK

DATATALK is a phone-in calculation service. The presentation includes actual DATATALK sessions and discussions with operators of this new service.

Place	Date & Time
Galbraith Bldg. Room 202	Sept. 12 4:15 p.m. Sept. 17 11:15 a.m.

Using a REMCOM Terminal

Demonstrations of the use of the equipment at the following locations will be held 10 - 11 a.m. and 3 - 4 p.m., weekdays, September 11 through September 18.

Arts & Science - Sidney Smith
Room 2105

Erindale - Room 2039

Management Studies - 246 Bloor St. W.
Room 219

New Physics - Burton Tower
Room 1202

Scarborough - Room S624

Mini Computing & Computer Research

A tour of the UTCC Research Facilities including computer graphics demonstrations. Tours meet outside room 207 in the Sandford Fleming Building at 11 a.m. and 2 p.m., weekdays, September 11 through September 18. Due to space limitations, the number of people on each tour will be kept small.

Introduction to Interactive Computing on the S/360-65

An introduction to the APL language and application packages available on the S/360-65.

Place	Date & Time
Erindale Room 1157	Sept. 11 2 p.m.
Scarborough Room 3232	Sept. 12 2 p.m.
Sandford Fleming Room 323	Sept. 13 3:30 p.m. Sept. 15 3:30 p.m. Sept. 17 3:30 p.m.

Introduction to TSO on the S/370-165

An introduction to the Time Sharing Option (TSO) including remote job entry, editing features, interactive computing.

cont'd...

UTCC OPEN HOUSE Cont'd...

Place	Date & Time	
Erindale Room 1157	Sept. 12	2 p.m.
Scarborough Room S143	Sept. 13	2 p.m.
Sandford Fleming Room 323	Sept. 11 Sept. 16 Sept. 18	3:30 p.m. 3:30 p.m. 3:30 p.m.

Don Gibson

UTCC PUBLICATIONS

The University of Toronto Computer Centre publishes a variety of documentation designed to describe and explain the services and facilities available to UTCC users. The following UTCC publications are available from the Information Office, located in the Sandford Fleming Building, room 128.

UTCC USERBOOK

The USERBOOK is the basic reference manual for all computing services available at UTCC. The USERBOOK is updated on a regular basis and updates are mailed automatically to subscribers.

MINI GUIDE TO UTCC

This pocket-sized guide provides a general description of the computer facilities available at UTCC.

VS PRIMER

The VS PRIMER contains a fairly comprehensive explanation of Virtual Storage. Implementation of OS/VS2 Release 2 on the UTCC S/370-165-II is tentatively scheduled for early 1975 and this primer describes how this new operating system will affect jobs submitted for processing on the S/370-165-II.

HOW TO SERIES

The HOW TO series of manuals are designed to assist users in the operation of the self-service equipment at UTCC. Each manual describes the basic techniques required to operate the equipment; step-by-step explanations are accompanied by examples and photographs. At present, the series contains four manuals. These are:

1. HOW TO USE
   - AN IBM 029 KEYPUNCH
   - AN IBM 2501 CARD READER
   - AN IBM 1403 LINE PRINTER
2. HOW TO USE
   - AN IBM 029 KEYPUNCH
   - AN IBM 2560 CARD READER/PUNCH
   - AN IBM 2203 LINE PRINTER
3. HOW TO USE
   - A REMCOM CARD READER
   - A REMCOM LINE PRINTER
   - A REMCOM TERMINAL STARTUP/PROCEDURE
   - A REMCOM CARD PUNCH
4. HOW TO USE
   - AN IBM 029 KEYPUNCH DRUM

cont'd...

UTCC PUBLICATIONS Cont'd...

DATATALK BROCHURE

This pocket-sized brochure introduces and describes DATATALK, a new UTCC service with emphasis on person-to-person communications. For a description of the DATATALK service, see the article WELCOME TO DATATALK appearing elsewhere in this issue of COMPUTERNEWS.

Janet Campbell

PERSONNEL CHANGES

Farewells this month go to Sue Elo, Joy Hisey, Stan Verscay and John Phillips. Sue is leaving to "tie the knot" and will be returning to university; Joy is planning to further her education; Stan is joining IBM and John has completed his appointment as Special Advisor for the Centre. Good Luck to all.

Newcomers are Ruth Borenstein, Faye Dennis, Ray Parker and Ashmeed Esack, all joining System/370 Services; Ruth as Dr. McNaughton's secretary, Faye as Stan Yagi's secretary, Ray as computer operator and Ashmeed as programmer. Wendy Kaye is joining Information Services as receptionist and Margo Harvie joins Publications as Assistant Editor. George Olshevsky joins us as a programmer in the newly formed Special Projects section under Mr. A. Heyworth. Mike Difulvio will be responsible for the supervision of the accounting staff and implementation of future financial and administration systems. We welcome you all and hope you will enjoy working with us.

Trudy Holland

RECENT ACQUISITIONS IN THE DEPARTMENT OF COMPUTER SCIENCE LIBRARY

Advances in information systems science. v.5 (1974)

Drummond, Marshall E.
American national standard COBOL for the IBM system 360-370, by
M.E. Drummond and M.N. Wayne.
Belmont, Cal., Wadsworth Pub. Co., 1973

House, William C., ed.
Data base management. 1st ed.
New York, Petrocelli Books, 1974

International Seminar on Urban Planning and Management Information Systems
Jerusalem, Jan. 1974
Proceedings
Jerusalem, Itlam, 1974

Metzger, Philip W.
Managing a programming project
Englewood Cliffs, N.J., Prentice-Hall, 1973

Page, E.S. and Wilson, L.B.
Information representation and manipulation in a computer.
Cambridge, University Press, 1973

Quirk, Randolph, et al.
A grammar of contemporary English
London, Longman, 1972

Schoenberg, I.J.
Cardinal spline interpolation
Philadelphia, Society for Industrial and Applied Mathematics, 1973

DAT INSTALLATION

During the period August 2 through August 11, UTCC's S/370-165 was upgraded to a S/370-165-II with the addition of the Dynamic Address Translation (DAT) feature. Two CPU frames were replaced and the remaining two frames were modified. The installation time required for this change had originally been scheduled to run from August 2 through August 19. However, the installation went so smoothly that production was resumed one week ahead of schedule. S/370 Services is now proceeding with the testing and tuning of VS2 Release 2 during test time in preparation for its introduction as the production operating system tentatively scheduled for the end of the calendar year.

During the shutdown period, service was extended to S/370 Services users who needed uninterrupted computing services by York-Ryerson Computing Centre and by the Information Systems Department of the University of Toronto.

To the IBM and ITEL engineers who worked so diligently in successfully bringing the DAT installation to an early completion, and to York-Ryerson and ISD for providing computer services to our users during the shutdown, S/370 Services extends its thanks.

Derry Cox

MANAGEMENT STUDIES TERMINAL

The Faculty of Management Studies and UTCC have reached an agreement whereby System/370 Services will undertake the management of the computer terminal located at the Faculty of Management Studies. This agreement is effective from August 1, 1974 until April 30, 1975.

A special welcome is extended to Mr. Paul Roth who will continue as Management Studies Terminal Co-ordinator. He can be reached at 928-4917. Both new and current users of Management Studies are invited to discuss their computing requirements with Paul. The terminal is located in room 219, 246 Bloor St. West.

Stan Yagi

SPEAKEASY DOCUMENTATION

SPEAKEASY is a computer language used for the interactive processing of data. The structure of the language is analogous to mathematics and most of the common functions and operations used in the physical and social sciences are built into the language. SPEAKEASY is designed to allow the user to obtain the results to problems in a quick, concise and easy manner.

SPEAKEASY is easy to learn and can be mastered in a few short terminal sessions. Complete documentation for SPEAKEASY is now available at the Information Office (SF128). The documentation consists of four modules described below, the first two of which are essential for using SPEAKEASY. The

cont'd...

SPEAKEASY DOCUMENTATION Cont'd...

last two modules are of a more specific nature and describe some special features of the language.

SPEAKEASY PRIMER

A general introduction and description of the language. The manual includes information on accessing the processor, performing mathematical operations and calculations in the super calculator mode, writing programs, storing and retrieving a user's data or programs on disk datasets. The manual includes a sample session which provides a complete set of examples. Almost no previous programming experience is needed to use SPEAKEASY at this level.

SPEAKEASY HELP FILE

A compilation of the words, functions and operations of the language for use in the interactive mode. The file includes a thorough description of each word in the language, useful examples for most of the words, an explanation of any TSO commands needed to use special words and an index listing the words according to their mathematical function or operation.

GRAPHEASY

A description of the words used exclusively for graphical output. This manual explains the function of all words that apply to the use of an interactive graphics terminal (e.g. Tektronix 4010). A number of examples and sample plots are included.

HOW TO WRITE A LINKULE

Describes in detail the process of creating and adding new words or commands to the language. Defining a new word allows the user to design the language to suit his particular computing needs and to interactively execute his FORTRAN programs that might normally be batch processed. A knowledge of FORTRAN and some TSO is assumed throughout this manual.

In addition to these documents which are available upon request, there are two manuals distributed by Argonne National Laboratory where SPEAKEASY was developed. These manuals can be purchased at the Information Office.

AN INTRODUCTION TO SPEAKEASY
(ANL-7995)

SPEAKEASY-3 REFERENCE MANUAL
(ANL-8000)

The latter contains a complete and detailed description of the function and use of the language and its features.

Any questions or suggestions regarding SPEASKEASY should be directed to Bob Schulte at 928-8701.

Bob Schulte

FORTRAN LIBRARY RENAMED

In order that TSO commands for interactive programming with FORTRAN will function as documented in the manuals, TSO users are advised that the following name changes are necessary for the two FORTRAN compiler libraries effective September 12, 1974.

cont'd...

FORTRAN LIBRARY RENAMED Cont'd...

Library
FORTRAN Program Product Library

Old Name	New Name
MOD.II.FORTLIB	SYS1.FORTLIB

Library
OS FORTRAN Library for G and H.

Old Name	New Name
SYS1.FORTLIB	SYS1217.FORTLIB

The IBM and UTCC FORTRAN and Graphics catalogued procedures will be changed accordingly. However, users who have their own JCL set up may have to rename their FORTRAN compiler libraries.

NOTE: The new SYS1.FORTLIB is the latest FORTRAN compiler library which includes all functions in the new SYS1217.FORTLIB and a number of other extensions for FORTRAN G1 and H-Extended. Therefore, JCL statements which have references to MOD.II.FORTLIB must be changed to refer to SYS1.FORTLIB while those that currently have SYS1.FORTLIB references may be left unchanged. Users with questions or problems regarding this change should contact Kin Fong at 928-4924.

Kin Fong

CURRENT STATUS OF LANGUAGE PROCESSORS

The following chart summarizes the current status of the language processors available on the S/370-165-II.

LANGUAGE	COMPILER LEVEL/NAME	SOURCE	RELEASE
ALGOL	F	IBM	21.7*
	W	Stanford U.	Jan72
ASSEMBLER	F	IBM	21.7
	G	U. of Waterloo	2.6
COBOL	F	IBM	May71*
	U	IBM	21.7*
	ANSI3	IBM	3.1
FORTRAN	G	IBM	21.7*
	H	IBM	21.7*
	G1	IBM	2.0
	X(H-Extended)	IBM	2.0
	WATFIV	U. of Waterloo	1.3
LINKAGE EDITOR	F	IBM	21.7
LOADER		IBM	21.7
PL/I	F	IBM	21.7*
	CHECK(CHECKOUT)	IBM	2.0
	OPT (OPTIMIZING)	IBM	2.1
SNOBOL	SNOBOL(SNOBOL4)	BELL	3.5
	SPITBOL	ILLINOIS	2.2
SORT/MERGE		IBM	1.2/1.3

KEY

*	the compiler is no longer fully supported
_	the default compilers and releases in UTCC catalogued procedures are underlined
U	University
Bell	Bell Telephone Laboratories
Illinois	Illinois Institute of Technology
IBM	International Business Machines Corporation.

Kin Fong

REVIEW OF TSO CHANGES

The start of the fall term is an appropriate time to review the various changes made to S/370 TSO during the spring and summer. Some of the more significant changes are summarized below for those users who have been away during these months. A detailed list of TSO changes can be obtained by entering HELP UTCC and HELP NEWS.

The file used by the HELP processor has been reorganized to have a more hierarchical structure. Entering HELP with no operands produces a list of group commands, not the standard IBM list of all commands. To get a list of all commands, enter HELP ALL. A list of Remote Job Entry commands is obtained by entering HELP RJE, dataset management by HELP DATAMGMT, etc. A series of documentation entries, listed in HELP DOCUMENT, has been added. One recently added document, HELP ABENDS, is similar to the older HELP ERRORS. For example, to find out what a system '613' abend is, enter HELP ABENDS OPERAND(S613). This could be abbreviated to read: H ABENDS O(S613). Similarly, to find out about Dynamic Allocation return code 40C, enter HELP ERRORS OP(DYN40C). For information about other lists of documentation, enter HELP DOCUMENT. Users who don't know how to use HELP can, of course, enter HELP HELP as usual.

The DELETE command has been modified to provide a modicum of dataset safety. When attempting to delete a dataset, the user will now be prompted, or given a "second chance" to confirm the dataset, before it is deleted. For example, consider the effects of entering:

```
d abc.asm
```

The response in an unmodified IBM system is READY. The user may then realize that he has typed 'd' instead of 'e'. The response from our modified 'DELETE' command is:

```
ENTER "YES" OR "Y" TO CONFIRM DELETION
TS12345.ABC.ASM+
```

to which the user would reply 'NO' or anything other than 'YES' or 'Y' if he wanted to keep that dataset.

Two applications packages, SPEAKEASY and NSCRIPT, are now available. SPEAKEASY is a fully-interactive mathematical and scientific programming language which originated at Argonne National Laboratories. An article elsewhere in this issue of COMPUTERNEWS describes the SPEAKEASY documentation. NSCRIPT is a powerful text-formatting processor. The input, created with the standard EDIT command, contains control words which specify page control, format control, indentation, indexing, footnote collection and other controls. Documentation on NSCRIPT will be published in USERBOOK. Draft copies are available now from SF116.

Some additions to the EDIT command have been made. Three commands, obtained from Palm Beach Computer Consultants in Florida, are COPY, MOVE and DUP. These should be installed by early September. Several other new subcommands are under consideration and/or development.

TSO users with suggestions are always welcome. Use the 'ISUGGEST' command or contact Ian Darwin in SF116 (928-7318).

Ian Darwin

TSO TOPICS

S/370 Development has acquired the services of Ashmeed Esack. Ashmeed, a welcome addition to the S/370 Development staff, will be devoting most of his time to TSO system development.

In an effort to handle the increasing number of suggestions from users, an 'ISUGGEST' command has been implemented. This provides a function similar to the 'ISUGGEST' facility available to batch users. To use the TSO facility, type 'ISUGGEST' and wait to be prompted for your suggestion. The data is written onto a disk file and submitted to us automatically. All suggestions are welcome and will be answered. The 'ISUGGEST' command should be used for suggested improvements to TSO functions and services. Problems with TSO should continue to be referred to the advisor.

A number of users have suggested that some high speed lines for TSO TTY-compatible CRT terminals be made available. A modification to the present 2703 Communications Controller is available which would, unfortunately, limit the system to a total of 24 lines. Since there were sometimes up to 31 users online during the spring term, and even more are expected during peak periods this fall and spring, this modification was considered unsatisfactory. After some investigation, an IBM 3704 controller was installed. This will provide TSO with sixteen 30-characters-per-second lines by the end of September. It will also provide potential for future expansion, which the 2703 modification would not. There will be an article in the next issue of COMPUTERNEWS with more information on the IBM 3704.

The UTCC USERBOOK sections applicable to TSO have been reprinted in a convenient 'TSO GUIDE' which includes a new introduction to TSO. This guide was mailed to TSO account holders and is given out with new accounts. Additional copies may be obtained at the UTCC Information Office.

The bug in FREEALL, which prevented it from freeing some datasets, has been corrected. A new version of the LIST/COPY/MERGE package has been received from IBM and should be installed by early September. Any problem with these, or other TSO services should be reported to the advisor or Terminal Co-ordinator.

Ian Darwin

SELF-SERVICE AT SFT

The Sandford Fleming Terminal (SFT) is a General Purpose Job Stream input/output terminal located in the Sandford Fleming Building, room 112. SFT provides both operator-assisted and self-service facilities.

Jobs can be printed on the self-service printers at SFT provided that:

1. less than 15,000 lines will be printed
2. no special forms are required

Jobs submitted through the card readers at SFT are automatically routed to the self-service printers if there is no /*ROUTE PRINT card requesting that the print be routed to another destination. Users requiring special forms at SFT should include the following card after the job statement:

```
/*ROUTE  PRINT LOCAL
```

cont'd...

SELF-SERVICE AT SFT Cont'd...

Users at other locations can route their output to the self-service printers if the following card is inserted after the job statement:

```
/*ROUTE  PRINT SELFSERV
```

ATS users can route their output to the self-service printer by specifying SELF as the destination and STD. as the forms number. The output will then be printed in uppercase on standard lined computer paper. There will be no forms mount charge. Example:

```
(ATTN)x;output;document;;pj;;;SELF;STD.
```

Mark Tapia

ATTENTION ASUT AND SFT USERS

S/370 Services has reorganized the functional responsibilities of two Terminal Co-ordinators. Marlene Domoney is now responsible for the operation and advising support for both the Arts and Science Terminal (AST) and the Arts and Science Undergraduate Terminal (ASUT). Users of these terminals should direct their questions or problems to Marlene in the Sidney Smith Building room 2105, phone 928-6509. Mark Tapia is now responsible for the advising support and operation of the Engineering Undergraduate Terminal (EUT) and the Sandford Fleming Terminal (SFT). Mark can be contacted in the Sandford Fleming Building room 114, phone 928-7109. In addition to the above duties, Mark will continue to act as High Speed Job Stream Co-ordinator.

Stan Yagi

THE TERMINAL CO-ORDINATOR

Who can help me with my JCL?

What is a Credit Request?

Where can I get documentation on SPSS?

What's a Terminal Co-ordinator?

I think I've found a bug with FORTRAN. Who do I contact?

Is TSO a new deodorant or what? How do I find out more about it?

The above questions could be asked by any number of S/370 Services users. Answers to all of the above questions can be obtained from your Terminal Co-ordinator.

This article will explain the function of the Terminal Co-ordinator and the interface system which has been established between Terminal Co-ordinators and central Computer Centre personnel.

A list of the terminal sites and the Terminal Co-ordinators responsible for each location follows:

Marlene Domoney
928-2043

Arts and Science Terminal
Room 2105
Sidney Smith Building
St. George Campus
University of Toronto

Vaughan Lawrason
828-5311

Erindale College
Room 2039
Erindale Campus
University of Toronto

cont'd...

THE TERMINAL CO-ORDINATOR Cont'd...

Paul Roth
928-4917

Faculty of Management Studies
Room 219
246 Bloor Street West
St. George Campus
University of Toronto

Mark Tapia Advisors
928-7109 928-8599

Sandford Fleming Terminal
Rooms 112, 117
Sandford Fleming Building
St. George Campus
University of Toronto

Ralph Lombardi
284-3173

Scarborough College
Room S624
Scarborough Campus
University of Toronto

In addition, the following personnel, provided by terminal sponsors, are available for operational assistance at the locations indicated.

Wolf Graf

Institute for Aerospace Studies
Room 162
Aerospace Studies Building
Dufferin Campus
University of Toronto

Bob Kazluskas

Faculty of Dentistry
Dentistry Building
St. George Campus
University of Toronto

George Ugray

Policy Analysis
Room 109
150 St. George Street
Coachhouse
University of Toronto

Dianne Reckhow

New Physics Terminal
Room 1202
Burton Tower
St. George Campus
University of Toronto

The Terminal Co-ordinator provides assistance and consultation for users of the S/370-165-II. Questions concerning availability of languages, packages, documentation and procedures for using each terminal should be directed to the Terminal Co-ordinator or designated staff. Questions and problems which cannot be answered will be referred to Central Site staff. Users are only required to see the Terminal Co-ordinator to solve a problem. All referrals and follow-ups will be handled by Terminal Co-ordinators on behalf of the user.

Terminal Co-ordinators cannot be experts in all aspects of computing but there are staff members who are specialists in particular areas of computing. Terminal Co-ordinators rely on these staff members for backup support in specific areas. Currently, S/370 Services has staff members who are specialists in the following areas:

cont'd...

THE TERMINAL CO-ORDINATOR Cont'd...

Engineering Applications
Numerical Analysis
Optimization Method Software
Statistical Packages
Graphics Software
TSO
JCL and Utilities
Language Processors (FORTRAN, PL1, ASSEMBLER)
SPEAKEASY

Documentation concerning all aspects of computing on the S/370-165-II is contained in USERBOOK Section 3 which may be obtained from the Information Office, SF128 (982-4990 or 928-4991).

USERBOOK Section 3 is prepared by the staff of S/370 Services and is updated frequently to reflect current policy, procedures and software pertaining to the S/370-165-II. All reference material referred to in the USERBOOK is available at each terminal. Missing documentation should be brought to the attention of the Terminal Co-ordinator.

S/370 Services endeavors to provide a high quality of service to all users. Occasionally problems do occur: software can be incomplete; hardware can malfunction; staff can make mistakes. The primary means for users to obtain credit for jobs which were not run properly is the UTCC Credit Request. A special form is used to submit a Credit Request. Forms are available at all terminal locations and should be submitted to the terminal personnel for approval. Documentation on Credit Request procedures is contained in USERBOOK 3.2190. Credit Requests provide S/370 Services with a valuable feedback mechanism on all aspects of our service.

Users are also invited to make use of the suggestion procedure and graffiti boards to comment or make suggestions on all aspects of our service. Perhaps the most direct and effective procedure is to make your Terminal Co-ordinator aware of your problems or suggestions.

S/370 Services' main function is to provide computing facilities for the University of Toronto. The Terminal Co-ordinator is there to help you use these facilities.

Stan Yagi

COMPUTING AT SCARBOROUGH COLLEGE

Scarborough College Computer Centre has something new this Fall for its users. It's a REMCOM model 4780 with a Univac Verifier-interpreter-punch (VIP) on-line for punched output. This machinery is replacing the IBM 360/20 and offers many improvements in service to our users.

REMCOM printing speed is approximately 600 lines per minute which is more than double the former 250 lines per minute. Both the reader and printer are easily operated and booklets explaining the use of the REMCOM terminal are available in the computer room (S-624) or in room S-630.

As well as the increased speed in I/O turnaround, there is an increase in space in the computer room. This will be a welcome change for all our users.

cont'd...

SCARBOROUGH COLLEGE Cont'd...

Any questions or problems regarding the new machinery or the Computer Centre should be directed to the Operator, Sandra Hargreaves or the Terminal Co-ordinator, Ralph Lombardi.

Ralph Lombardi

ARTS AND SCIENCE TERMINAL

The Arts and Science Terminal (AST), located on Room 2105, Sidney Smith Hall, is available to S/370 users on a self-service basis. Only General Purpose Job Stream (GPJS) jobs may be run on this terminal. However, High Speed Job Stream (HSJS) service is available downstairs in Room 1073 at the Arts and Science Undergraduate Terminal.

Currently, AST facilities include a REMCOM card reader (600 cards/minute) and line printer (600 lines/minute). By September, a Univac VIP interpreter-keypunch will be connected to the REMCOM to provide card punching service. Additional equipment includes keypunches, work tables, and a 3275 Backlog Display unit.

Hours of operation at AST are 8 a.m. - 10 p.m. and midnight - 6 a.m., Monday to Friday, and 10 a.m. - 5 p.m., Saturday and Sunday. Operational and programming problems, as well as general enquiries may be referred to the AST Terminal Co-ordinator, Marlene Domoney. The AST advising hours are 9 a.m. - 5 p.m. Monday to Friday.

Marlene Domoney

ERINDALE ROOM CHANGES

We have had an extensive facelift at Erindale College Computer Services this summer.

Hopefully these changes will make for a better run centre with more efficient use of available space. Everyone is welcome to come out to have a look at the new room arrangments.

New Room Locations

Terminal Co-ordinator
Vaughan Lawrason
Room 2043, phone 828-5311

Operator and General Inquiry
Muriel Elles
Room 2039A, phone 828-5339

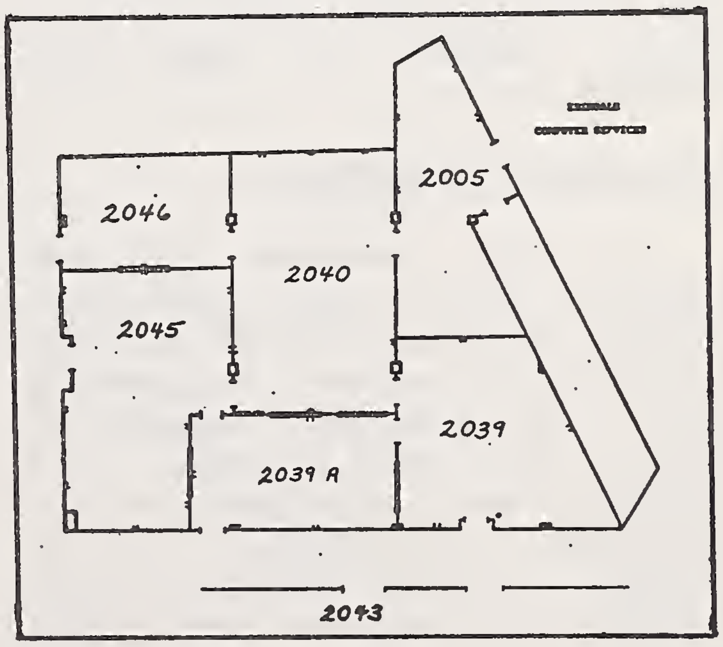
Keypunch Room - room 2039

2741 Terminal Room - room 2045

Quiet Work Area - room 2046

4780 Remcom Terminal - room 2040

Computer Science Tutors - room 2005



Muriel Elles

HIGH SPEED JOB STREAM NEWS

The following is a summary of various changes that have been made to the High Speed Job Stream during the summer.

New Processors

SPSSQ and SNAP are now available on the High Speed Job Stream. These processors are designed to be used for manipulating data and generating statistics. SPSSQ was developed at Stanford University and is based on the small version of SPSS which is called SPSSG. Unlike the standard SPSS, SPSSQ simulates all scratch I/O by using areas in memory. It can handle a smaller amount of data than SPSS and will not allow the user to save or retrieve files.

SNAP, the other statistical package, was developed at Princeton University and has been widely used in Statistics classes. Both SNAP and SPSSQ are interpreters and are limited to 600 lines, 20 pages of output and five seconds of CPU time for an entire job. Both accept a free format job card and allow the user to incorporate input from a source library by using the $INCLUDE feature.

SP/k Compiler Available

An SP/k compiler is now available on the High Speed Job Stream. SP/k was designed to teach introductory computer programming and is a structured sequence of subsets of the PL/I language. The compiler was developed at the University of Toronto by the Computer Systems Research Group (CSRG). The compiler has already been used in one introductory Computer Science course and occasionally usage surpassed that of PL/C. Documentation on the SP/k compiler is available from CSRG. USERBOOK documentation will be available in mid September. Handouts on the $JOB card format are now available from the Information Office and from the Terminal Co-ordinators.

$INCLUDE Support Available

Four processors on the High Speed Job Stream, PL/C, SNAP, SP/k and SPSSQ now have a $INCLUDE library feature. This enables the user to incorporate source (or data) from a file called a library. An entire class may, for example, be required to run its program using the data supplied in the library. In this way, programs can be tested thoroughly and graded more easily with a standard set of examples. Canned programs can also be placed in the library to operate on data supplied by the user. To use this feature, place a $INCLUDE card in the deck at the point where the text will be incorporated. The card includes the name of the member to be retrieved from the library. The card format is:

```
cc1
  $INCLUDE member_name
```

To obtain a list of valid member names for a particular library, submit the following UTILITY job:

```
$JOBR MEMBER=INDEX,LIBRARY=lib_name
```

cont'd...

HIGH SPEED NEWS Cont'd...

To obtain a valid list of library names, submit the following UTILITY job:

```
$JOBR MEMBER=INDEX
```

The following library names are available:

NEWS	basic library
PLCLIB	PL/C library
WATLIB	WATFIV library
ASMGLIB	ASMG library
SOURCLIB	SP/k,SNAP,SPSSQ library

To add members to any library contact Mark Tapia at 928-7109 or in SF114.

Mark Tapia

HSJS MONTHLY STATISTICS

During the month of July, 1974, 63,889 jobs were processed compared with 56,201 for the previous year, an increase of 13.7%.

The following charts summarize the HSJS activity for the month of July. The graph represents the average number of jobs processed during each half hour period of the day.

Mark Tapia

```
RESOURCE_USAGE_BY_PROCESSOR

                              ||     TOTAL PER PROCESSOR          ||    AVERAGE PER USE        |
                              ||   CPU    |  #CARDS  |  #LINES    ||  CPU   |#CARDS | #LINES   |
PROCESSOR | #USES  %TOTAL     ||  (MIN)   |   READ   |  PRINTED   || (MIN)  | READ  | PRINTED  |
-----------------------------------------------------------------------------------------------
WATFIV    | 40029  (63)       ||  745.68  |  9033398 |  8338412   || 0.016  |  224  |   208    |
PL/C      | 14750  (23)       ||  213.40  |  1659498 |  2871058   || 0.012  |  112  |   192    |
UTILITY   |  2970  ( 5)       ||   12.46  |   683587 |   747481   || 0.004  |  228  |   248    |
SP/k      |  1586  ( 2)       ||   24.04  |    89263 |   186677   || 0.012  |   56  |   116    |
WATBOL    |  1566  ( 2)       ||   27.29  |   440768 |   427345   || 0.016  |  280  |   272    |
ASMG      |  1034  ( 2)       ||   16.64  |   232200 |   302870   || 0.016  |  224  |   292    |
SPITBOL   |   797  ( 1)       ||   15.33  |   372913 |   252076   || 0.016  |  464  |   316    |
ALGOLW    |   722  ( 1)       ||   31.16  |   256940 |   165353   || 0.043  |  352  |   228    |
PLUTO     |   273  ( 0)       ||    2.93  |    29212 |    44211   || 0.008  |  104  |   160    |
LISP      |   117  ( 0)       ||    1.14  |     5585 |    16085   || 0.008  |   44  |   136    |
ASSIST    |    38  ( 0)       ||    0.26  |     5626 |     9554   || 0.004  |  148  |   248    |
SIMON     |     7  ( 0)       ||    0.03  |      277 |      290   || 0.000  |   36  |    40    |
-----------------------------------------------------------------------------------------------
TOTAL       63889             || 1090.35  | 12809267 | 13361412   || 0.017  |  200  |   209    |
```

```
ALL TERMINALS                                           JOB VOLUME FOR 02/07/74 - 31/07/74
CLASS = W                                                    (AVERAGE OVER 20 DAYS)

                                                    # JOBS WHICH BEGAN EXECUTION AT INDICATED TIME
                                      25   50   75  100  125  150  175  200  225  250  275  300  325  350  375  400  425  45
                        |#JOBS|TOD|----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+---
                        |    5|   |6
PROCESSOR #USES   %     |    6|   |6
WATFIV    40029 (62)    |    6|  1|6
PL/C      14750 (23)    |    4|   |
UTILITY    2970 ( 4)    |    3|  2|
SP/k       1586 ( 2)    |    1|   |
WATBOL     1566 ( 2)    |    1|  3|
ASMG       1034 ( 1)    |    1|   |
SPITBOL     797 ( 1)    |    0|  4|
ALGOLW      722 ( 1)    |    0|   |
PLUTO       273 ( 0)    |    0|  5|
LISP        117 ( 0)    |    0|   |
ASSIST       38 ( 0)    |    0|  6|
OTHER         0 ( 0)    |    0|   |
                        |    0|  7|
                        |    0|   |
                        |    6|  8|6
                        |   22|   |6666
                        |   36|  9|6666666
                        |   52|   |6666666666
                        |   67| 10|6666666666666
                        |   78|   |666666666666666
                        |   84| 11|6666666666666666
                        |   99|   |6666666666666666666
                        |   85| 12|66666666666666666
                        |   87|   |66666666666666666
                        |  100| 13|66666666666666666666
                        |  106|   |666666666666666666666
                        |  109| 14|666666666666666666666
                        |  120|   |666666666666666666666666
                        |  120| 15|666666666666666666666666
                        |  115|   |66666666666666666666666
                        |  110| 16|6666666666666666666666
                        |  107|   |666666666666666666666
                        |   86| 17|66666666666666666
                        |   76|   |666666666666666
                        |   66| 18|6666666666666
                        |   70|   |66666666666666
                        |   72| 19|66666666666666
                        |   77|   |666666666666666
                        |   71| 20|66666666666666
                        |   75|   |666666666666666
                        |   64| 21|666666666666
                        |   66|   |6666666666666
SHIFT    #JOBS          |    2| 22|
0 - 8     1000          |    0|   |
8 - 4    36192          |    0| 23|
4 - 12   26697          |    2|   |
                         2281|   | 8-SERVICE FACTOR(2.0) || 6-SERVICE FACTOR(1.0) || 4-SERVICE FACTOR(0.6)

TOTAL JOBS AT SF 0.6 (UNAVERAGED)     1
TOTAL JOBS AT SF 1.0 (UNAVERAGED) 63888
TOTAL JOBS AT SF 2.0 (UNAVERAGED)     0
TOTAL JOBS AT ALL SF (UNAVERAGED) 63889
```

S/370 RELIABILITY

For the month of July, the system reliability dropped severely. The total downtime sharply increased to a near record of 2806 minutes. 96% of the downtime was directly attributed to hardware failures.

For July, the uptime percentage was 91.7 while the average number of IPL'S per day was 1.66. The scheduled hours of production totalled 502.

MONTHLY COMPARATIVE FIGURES

MONTH	% UPTIME	UNSCHED IPL'S/DAY
JAN 73	96.8	o.87
FEB 73	98.3	1.18
MAR 73	97.8	1.16
APR 73	97.1	1.39
MAY 73	98.5	1.20
JUNE 73	98.5	1.70
JULY 73	99.4	0.37
AUG 73	97.6	1.13
SEPT 73	86.8	3.63
OCT 73	95.6	1.83
NOV 73	98.1	0.93
DEC 73	98.6	0.62
JAN 74	97.0	1.37
FEB 74	98.3	1.25
MAR 74	98.7	1.06
APR 74	99.3	0.52
MAY 74	99.2	0.87
JUN 74	96.1	0.75
JUL 74	91.7	1.66

The percentage breakdown of total system downtime was: HARDWARE-2704 minutes (96.4%); SOFTWARE-58 minutes (2.1%); OTHERS-44 minutes (1.5%). The major events contributing to these downtime totals were as follows:

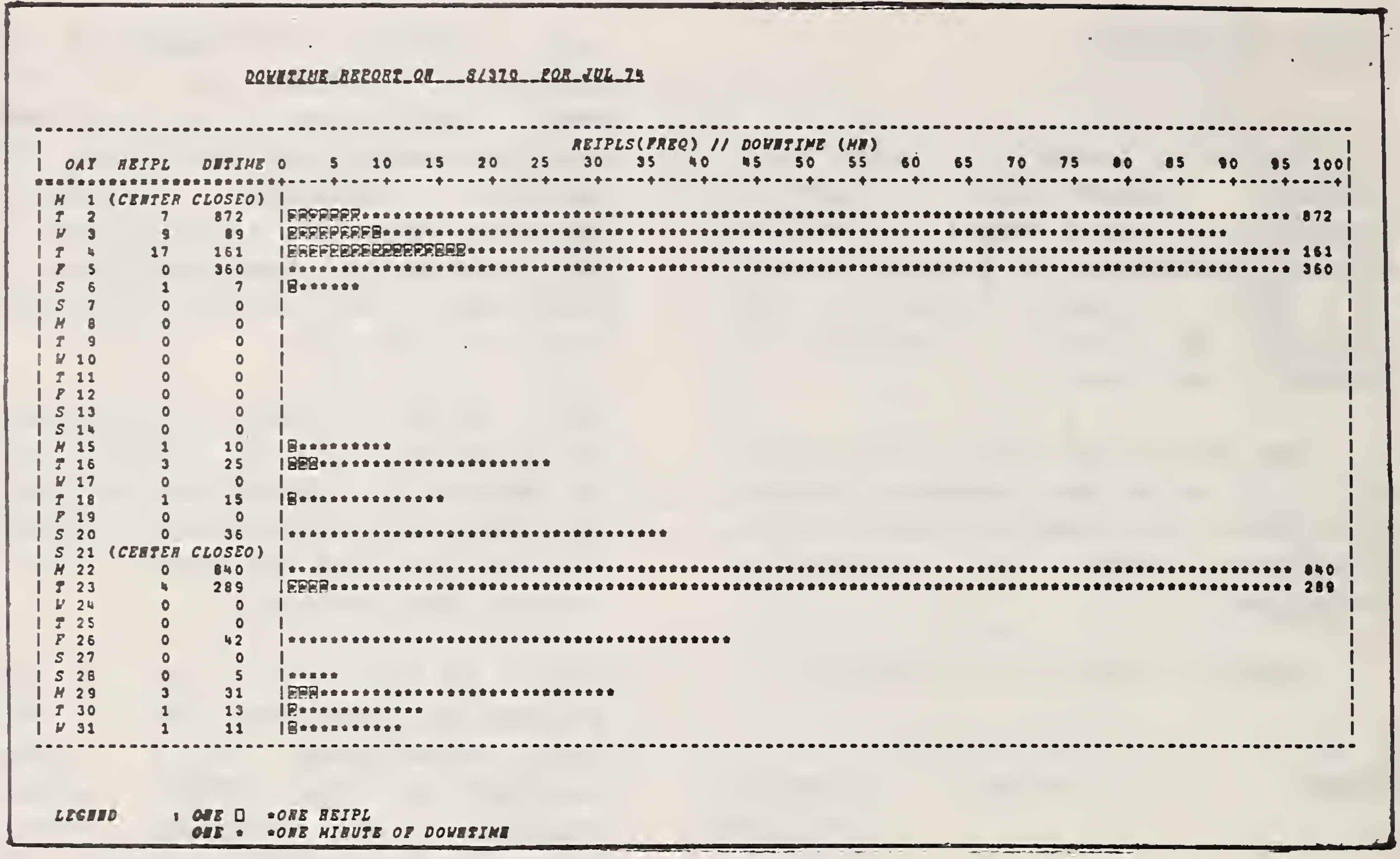
July 2,3,4,5 - A total of 1482 minutes of downtime and 33 IPL'S were attributed to hardware problems associated with the 2880 channel upgrades. Numerous separate bugs were responsible for the continuous downtimes over the four days. IBM finally rectified these on July 5th.

July 16,20 - A total of 56 minutes of downtime and 2 IPL'S were attributed to a hardware problem in the 2860 byte multiplexor channel. A bad part was replaced by IBM to correct the problem.

July 22,23 - A total of 1129 minutes of downtime and 4 IPL'S were attributed to a hardware problem in the 2870 selector channel. All problems occurred after IBM performed upgrades to the channel.

July 26 - A total of 42 minutes of downtime were attributed to storage errors in the ITEL memory and the corrective maintenance required by ITEL to rectify the problems.

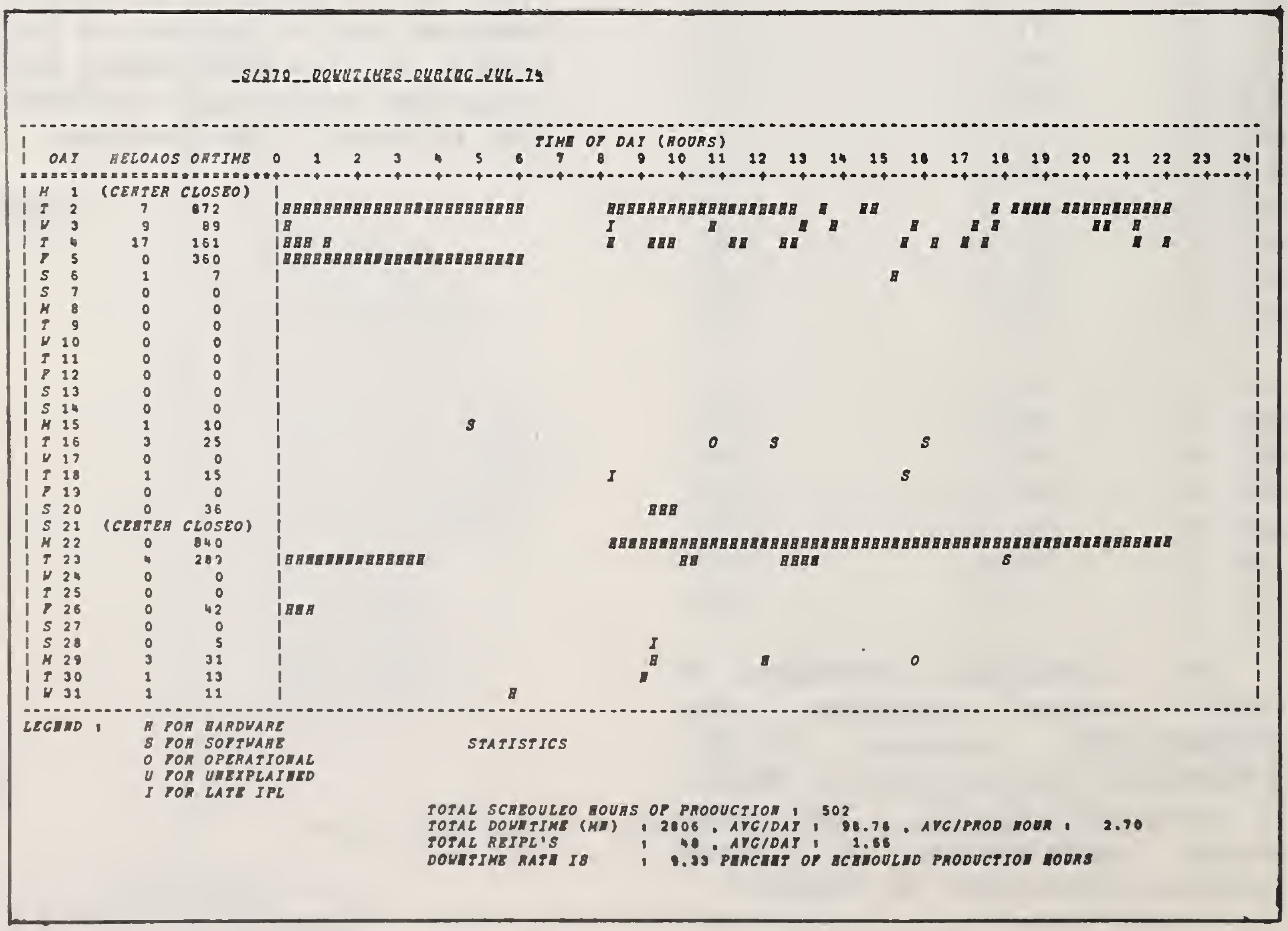
Dave Rauch



```
DOWNTIME REPORT OF    S/370   FOR JUL 74

                                          REIPLS(FREQ) // DOWNTIME (MN)
 DAY  REIPL   DNTIME 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95  100
 M  1 (CENTER CLOSED)
 T  2      7     872                                                                                                  872
 W  3      9      89
 T  4     17     161                                                                                                  161
 F  5      0     360                                                                                                  360
 S  6      1       7
 S  7      0       0
 M  8      0       0
 T  9      0       0
 W 10      0       0
 T 11      0       0
 F 12      0       0
 S 13      0       0
 S 14      0       0
 M 15      1      10
 T 16      3      25
 W 17      0       0
 T 18      1      15
 F 19      0       0
 S 20      0      36
 S 21 (CENTER CLOSED)
 M 22      0     840                                                                                                  840
 T 23      4     289                                                                                                  289
 W 24      0       0
 T 25      0       0
 F 26      0      42
 S 27      0       0
 S 28      0       5
 M 29      3      31
 T 30      1      13
 W 31      1      11

LEGEND     : ONE □  =ONE REIPL
             ONE *  =ONE MINUTE OF DOWNTIME
```



```
S/370  DOWNTIMES DURING JUL 74

                                        TIME OF DAY (HOURS)
 DAY   RELOADS ORTIME  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
 M  1  (CENTER CLOSED)
 T  2      7     872
 W  3      9      89
 T  4     17     161
 F  5      0     360
 S  6      1       7
 S  7      0       0
 M  8      0       0
 T  9      0       0
 W 10      0       0
 T 11      0       0
 F 12      0       0
 S 13      0       0
 S 14      0       0
 M 15      1      10
 T 16      3      25
 W 17      0       0
 T 18      1      15
 F 19      0       0
 S 20      0      36
 S 21  (CENTER CLOSED)
 M 22      0     840
 T 23      4     289
 W 24      0       0
 T 25      0       0
 F 26      0      42
 S 27      0       0
 S 28      0       5
 M 29      3      31
 T 30      1      13
 W 31      1      11

LEGEND :     H FOR HARDWARE
             S FOR SOFTWARE                    STATISTICS
             O FOR OPERATIONAL
             U FOR UNEXPLAINED
             I FOR LATE IPL

                          TOTAL SCHEDULED HOURS OF PRODUCTION :  502
                          TOTAL DOWNTIME (MN)   : 2806 , AVG/DAY :  96.76 , AVG/PROD HOUR :    2.70
                          TOTAL REIPL'S         :   48 , AVG/DAY :   1.66
                          DOWNTIME RATE IS      :  9.33 PERCENT OF SCHEDULED PRODUCTION HOURS
```

INTERACTIVE SYSTEMS RELIABILITY

The uptimes for APL, ATS, and CPS for the month of July were 99.59%, 99.51% and 99.49% of scheduled operation, respectively. The total number of scheduled hours of operation during the month of July were 512.5, while the number of unscheduled IPL's per day was 0.23. In addition to the scheduled time APL, ATS and CPS were also available for approximately 141 hours of unattended weekend operation.

The percentage breakdown of total system downtime was: Hardware - 105 mins. (64.02%), Software - 9 mins. (5.49%), Other - 50 mins. (30.48%). The following table summarizes the time lost out of scheduled hours of production due to system failures for each of the systems. Six unscheduled IPL's were required as a result of the failures.

Kam Jain

DATE	DOWNTIME (mins)			REASON
	APL	ATS	CPS	
Thu. July 11	-	2	-	ATS Abend S202 (SOFTWARE)
Mon. July 15	16	18	19	*Solid System on Test I/O (HARDWARE)
Tue. July 16	20	22	23	*Solid System on Test I/O (HARDWARE)
"	22	24	25	"
Sat. July 20	20	21	22	Late IPL due to operating error (OPERATIONAL)
Tue. July 23	-	7	-	ATS Abend S202 (SOFTWARE)
Thu. July 25	17	21	24	*Power Failure
Tue. July 30	8	10	12	*Solid System, ROS Loop in Ch. 0 (HARDWARE)
Wed. July 31	21	26	30	"
Total	124	151	155	*IPL Required

System Failures July 1 to July 31, 1974

NEW DIGITIZING TABLET AT CRF

The Computer Research Facility has added a digitizing tablet to the GT-44 computer system. The tablet has an active area of 20" x 20" and can be used with either a hand-held stylus (similar to a ball-point pen) for fast informal work or freehand drawing, or a cursor for precise work with zero parallax. The resolution of the tablet is 100 lines to the inch for both X and Y axes and the maximum conversion rate is 200 co-ordinator pairs per second. The operation principle is "magnetostrictive ranging" which is completely silent.

The tablet will be supported by two major software systems, the first of which is now complete. Documentation is available from the CRF Lab Co-ordinator.

Continuous Digitizing

This system allows continuous streams of X/Y co-ordinates to be placed on magnetic tape. These tapes can then be processed using any computer system with magnetic tape support. Specifically, routines exist on the System/370 for accessing the data under FORTRAN and a system exists for selectively plotting the data on the Gould plotter.

Graph Plot Mode

This system allows digitizing of data in the Y direction only, for compact storage of graphical information. Up to 4 graph plots may be stored simultaneously in an interleaved manner. This system was specifically designed for digitizing of strip chart recordings and oscilliscope photographs.

Users wishing to use the tablet in their own programs should contact the CRF Lab Co-ordinator for further information on the tablet hardware interface.

Dennis Smith

WELCOME TO DATATALK

DATATALK is a unique concept in computing services made available to the university community by the U of T Computer Centre.

DATATALK is, first of all, a calculation service which provides immediate over-the-telephone computer solutions to a wide range of relatively small-sized computational problems that arise every day.

How do we do it? While you are describing your problem and data via telephone, the DATATALK operator interprets the problem description into a high-level computer language, processes the resulting program (or programs) and then reads the answers back to you within seconds. DATATALK requires no knowledge of any computing language on the part of the subscriber.

University of Toronto DATATALK is daily making possible immediate answers to both simple and quite complex computational problems. If all you really need are answers, find a phone and dial 928-6710. We're ready to handle a growing variety of problems.

DATATALK is now available 10 a.m. to 10 p.m. Monday through Friday, at a nominal flat monthly subscription rate to everyone within the university community.

Watch for us! We're waiting for your call. Call us, too, for our blue and white brochure, and a DATATALK telephone sticker. Full details of the DATATALK services will be available soon in USERBOOK Section 7.

Ernst Goetze

DATATALK CAR POOLS

During the recent transit strike in Toronto, which immobilized all subway, bus, and streetcar transportation, University of Toronto DATATALK used its unique communication facilities and computer file structures to implement a computer-assisted coordination of informal car pools for the staff of UTCC and other departments on campus.

cont'd...

DATATALK CAR POOLS

Cont'd...

The car pools proved to be one the of most popular DATATALK services. We were successful in establishing about a dozen new car pool routes throughout Metro, matching up volunteer drivers with 25 otherwise stranded passengers. The passenger waiting list was, of course, much longer due to a shortage of drivers, particularly in the west end of the city. However, we thank both passengers and drivers for their co-operation.

Due to the popularity of this venture, DATATALK car pool services may become a permanent feature of the DATATALK service. Please watch for future COMPUTERNEWS articles on this topic.

Ernst Goetze

DIALOGUE: LEAST SQUARES WITH DATATALK

DATATALK: "Hello. University of Toronto DATATALK, Ernst Goetze speaking."

LEWIS: "Hello. Phil Lewis here. My password is 'problem'."

D: That's fine, Phil. How's everything?

L: Fine. I'm at the cottage on holidays. But I couldn't resist the temptation to measure the height of three mountains near here. It's never been done before, you know?

D: Hm.

L: Anyway, I did my surveying from sea level. The first one I measured, call it A, was 1236.5 feet. The second one, call it B, was 1941.3 feet.

D: Phil?

L: Hm?

D: I'm typing these in.

L: O.K. But I'm not sure yet how to handle this problem. In fact, don't type in any more until you hear the rest of this.

D: O.K.

L: Getting the height of C was a bit more difficult, because B is in front of it. But it's about 2417 feet. To get a better measurement, I climbed the one we called A and measured the height of C above A, that is, I got a reading of C minus A of 1177.2 feet. While I was up there, I also measured B minus A and got 711.5. It just doesn't work out though.

D: What do you mean?

L: Well, I know that A is 1236.5, and if you add the B minus A measurement of 711.5 to that, you get B's height as 1948, but I measured B directly as 1941.3 feet, and that's a difference of almost 7 feet.

cont'd...

DIALOGUE Cont'd...

D: Oh, that's O.K.
L: No, it's not O.K. What is the height? What can I say the height is?
D: What I meant is that some error is bound to occur in any measurements like that. What most people do is take a least squares solution, or use averages.
L: No.....No averages......Least squares might be alright, though.
D: O.K. Which measurements do you want to include?
L: All of them...even that first measurement for C.
D: I've got the first two, A and B. Would you read the others to me please?
L: C was 2417 feet. B minus A was 711.5 feet. And C minus A was 1177.2.
D: Thanks, Phil......O.K., here we are. The least squares solution gives A equal to 1235.65 feet, B as 1944.225, and C as 2414.925 feet.
L: Oh? That's not too bad. What do we get if we ignore the first measurement for C?
D: Then, let's see.....We get A equal to 1234.27 feet, B equal to 1943.53 feet, and C equals 2411.47.
Of course, in that case, you're only admitting the observed error in B.
L: Well, yes.....O.K. That's what I think I'll do. I copied down those numbers as you read them out, but would you send them on to my office anyway?
D: Yes sir. Thanks for calling.
L: Thank you. 'Bye now.

Ernst Goetze

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	49 St.Geo	6496
ASSOCIATE DIRECTOR		
Al Heyworth	49 St.Geo	4936
ASSOCIATE DIRECTOR		
Dave McNaughton	SF143	6281
CONTRACT PROGRAMMING		
Bill Greene	SF214C	2694
INFORMATION OFFICE		
General Inquiries	SF128	4990 or 4991
Don Gibson	SF128A	5568
ADMINISTRATION MANAGER		
Anthony Pieterse	SF137	8948
AUTHORIZATION CLERKS		
Yvonne Bowen (Interactive)	49 St.Geo	8703
Barbara Ablett (GPJS, TSO)	SF115	5557
Krishna Patnaik (CRF)	SF207	8853
Edith Kovacs (7094)	NP1207	7094
S/370 SERVICES		
MANAGER, S/370 SERVICES		
Stan Yagi	SF113	7331
MANAGER, S/370 OPERATIONS		
Derry Cox	SF113	7092
MANAGER, S/370 SOFTWARE		
Rein Mikkor	SF113	5058
SYSTEM HARDWARE SUPERVISOR		
Eugene Siciunas	SF114	4967
PROGRAM ADVISERS	SF117	8599
INTERACTIVE TERMINAL SYSTEMS		
MANAGER		
Sam Goldfarb	49 St.Geo	3787
CAL COORDINATOR		
Ford Clancy	49 St.Geo	6021
7094 SERVICES		
MANAGER		
Joyce Walton	BT1207	7094
COMPUTER RESEARCH FACILITY		
MANAGER		
Dennis Smith	SF214B	4086

JOB STATUS QUERIES:	
SYSTEM/370	7373
7094	7094
INTERACTIVE TERMINAL SYSTEMS:	
System Status	6234
APL	7200
ATS	7100
CPS	6200
TSO:	
2741 Terminal Malfunctions	7107
2741	7303
TTY	7390

UTCC COMPUTER EQUIPMENT

SYSTEM/370 MODEL 165-II

- located in SF103/105/112
- provides General Purpose Job Stream, High Speed Job Stream and TSO services
- 3072K bytes of memory
- 1 drum
- 12 disk drives (3330)
- 8 disk drives (2314)
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 5 card readers
- 1 card punch
- 7 remote batch terminals
- 1 paper tape reader
- Calcomp plotters (11" and 30")
- Gould plotter (11")
- OS/MVT with HASP

SYSTEM/360 MODEL 65

- located in McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 140 typewriter terminals
- OS/MVT with APL, ATS, and CPS

7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

COMPUTER RESEARCH FACILITY

- located in SF207
- DEC GT44 System with
  - 1 PDP-11/40 CPU
  - 2 9-track dual density tape drives
  - 1 1000 cpm card reader
  - VT17 graphics display unit
  - 1 lab. peripheral system with A/D & D/A
- DEC GT40 System with
  - 1 PDP-11/10 CPU
  - 1 2314 type disk drive
  - 1 VT12 graphic display unit
  - 9-track/800 BPI tape drive
  - 1 Calcomp microfim plotter
- 2 digitizing tablets
- 1 2701 data adapter with RADDTS

UNIVERSITY OF TORONTO
COMPUTER CENTRE,
TORONTO, CANADA.

CAMPUS DELIVERY

DR J C WILSON
DIRECTOR
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49 ST GEORGE ST
RM 303
UNIVERSITY OF TORONTO